

Risk Control  
White Paper

Slip and Fall Control Techniques for Commercial Real Estate Owners

Jeff Janke, ARM, and David D. Ludwin, CSP  
CNA

April 2008

## Premises liability

Premises liability refers to the legal responsibility of a property owner or manager of real property for injuries caused to others or their property due to conditions or activities on the property.<sup>1</sup> Slips and falls in public places are far and away the leading cause of premises liability injuries. More than one million people suffer from a slip, trip or fall injury each year, and more than 16,000 die as a result of falls.<sup>2</sup>

A nationwide survey of premises liability cases “found that plaintiffs won cases more frequently than the defense in 2000, and the median compensatory awards have risen steadily since 1994.”<sup>3</sup> This study reported that the “median award rose 15% in 2000 to \$114,862 from \$100,000 in 1999. Between 1994 and 2000, the median award rose 88%.”<sup>4</sup>

Without question, slips and falls are the leading cause of nonfatal unintentional injuries that are treated in hospital emergency departments. According to data from the All Injury Program, a cooperative program involving the National Center for Injury Prevention and Control, Centers for Disease Control and the Consumer Product Safety Commission, nearly eight million people were treated for fall-related injuries in 2003. Falls were the leading cause of nonfatal injuries for all age groups except 15-24 years old.<sup>5</sup>

With the aging baby boomer generation, the size and scope of this issue is expected to grow significantly. The National Floor Safety Institute (NFSI) estimates that between 2005 and 2020, the number of seniors in the U.S. will increase from 35 million to 77 million. Statistically, seniors are far more likely to experience a slip-and-fall accident. For those that are injured, the cost of treatment and recovery time is significantly greater than the average for non-seniors.<sup>6</sup> According to the American Academy of Orthopedic Surgeons, these types of injuries are also the leading cause of hospital admission for older adults.<sup>7</sup>

There are five major causes for slip-and-fall accidents:

1. Lack of slip resistance on walking surfaces
2. Poor walking surface conditions
3. Poor visibility
4. Lack or poor condition of handrails and guardrails
5. Poor accessibility<sup>8</sup>

To help policyholders improve safety and continue profitable growth, CNA conducted a case study on slips and falls in the restaurant industry in 2007. The restaurant industry experiences more of these events than any other industry that CNA services. This paper applies the lessons learned from this study to the issue of slip and fall prevention as it applies to building owners and managers in the real estate sector.

## Background

CNA initially began working on a new approach to slip and fall issues in April 2004. In March 2005, CNA formed a strategic partnership with the National Floor Safety Institute. The NFSI was founded in 1997 as a not-for-profit organization whose mission is to “aid in the prevention of slip and fall accidents through education, training and research.”

## What is slip resistance?

Slip resistance is generally measured by defining the coefficient of friction (COF) between two surfaces. An example is the relationship between a shoe and a floor surface. There are two COF measures:

- Static – The force necessary to start a body moving
- Dynamic – The force necessary to keep this same body moving

In the U.S., the static COF is the customary method of measuring slip resistance. The COF is generally measured between 1.0, for very rough surfaces (e.g., sand paper) and 0.0, for extremely slippery surfaces (e.g., water on ice).

The American National Standards Institute's (ANSI), A1264.2-2001 "Standard for the Provision of Slip Resistance on Walking/Working Surfaces," suggests a static COF of > .05 for walking surfaces under dry conditions.

However, the NFSI has developed an additional test method, NFSI B101,1. This standard defines a "High Traction" walkway as having a measured static COF of > .06 for wet walking surfaces. According to the NFSI, floor surfaces maintaining this level of slip resistance when wet have proven to reduce slip-and-fall claims by 50% to 90%.<sup>9</sup> This standard was chosen as part of the CNA study because it more closely replicated real world situations.

### **What factors influence slip resistance?**

Any factor that changes the level of friction between two surfaces affects slip resistance. When a floor surface and the sole of an individual's shoe are clean and dry, there is generally a high level of friction between the surfaces. In this case, the likelihood of slips and falls is reduced. Over time, as flooring surfaces and shoe soles become covered by foreign materials or become wet, the level of friction is reduced. As this occurs, the likelihood of a slip or fall increases.

Foreign materials include dirt, grease and water. However, some cleaning products used on flooring surfaces can build up a film in the pores of flooring material. This reduces the friction produced by the surface, increasing the likelihood of slips and falls. Such a buildup of materials is called "polymerization." The longer polymerization continues, the more difficult it is to remove. This becomes extremely important in cases where the floor surface occasionally becomes wet, such as in restaurants.

Frequently in the real estate industry, occasional spills, weather-related hazards, wet and oily surfaces, and changes in the degree of traction serve as primary causes of slips and falls.

### **What CNA learned**

More than 650 individual measurements of flooring surfaces in public areas were compiled at locations participating in the four-month study. The results highlighted the importance of establishing and adhering to a regular floor care maintenance program. Study results showed consistent improvement in flooring slip resistance following cleaning.

The actual degree of improvement was observed to be in large part dependent on the training and technique of the cleaning personnel. Testing also highlighted the importance of floor mat care and maintenance in preventing cross contamination of flooring surfaces. Finally, the sampling revealed that the most heavily used routes between the doorways and interior areas must be the focal point in any cleaning and matting strategy.

Following the exact directions provided by a manufacturer when applying floor cleaning compounds is crucial to the success of a floor maintenance program. Proper training and outfitting of applicators must be monitored. Targeting cleaning and floor maintenance activities to those areas known for producing low-slip resistance makes a slip and fall prevention program more efficient.

Even though the flooring surfaces, facility layouts, operations and cleaning products used were consistent over the locations involved in the study, there were considerable differences in the slip resistance readings between locations. The common difference that each facility shared was that floor maintenance and cleaning was performed by an outside contractor. Allowing for all other factors, contractor application emerged as a critical variable in CNA's study.

Following cleaning, each flooring surface exhibited a significant improvement in its individual slip resistance. The actual degree of improvement differed with each facility and sampling location.

Floor mats, especially when used at entranceways effectively reduced the movement of materials, such as dirt and water, into the facility. However, to maintain their effectiveness, the mats needed to be changed out at regular intervals before becoming saturated. Saturated mats were observed to make the situation worse. Additionally, the heavily soiled mats allowed contaminants to migrate to the clean public areas, significantly affecting slip resistance.

Similarly, areas with permanently installed mats and carpet runners need to undergo regular maintenance and thorough cleaning to remove the buildup of contaminants that could otherwise be tracked throughout a facility.

### Recommendations

Based on the CNA study and findings, general recommendations were made to the restaurant chain. These recommendations can be applied by building owners and managers to help lower their risk for slip and fall incidents.

- Select high-traction, slip-resistant flooring materials when building, expanding or remodeling facilities. Installation of such materials with proven high traction characteristics is one of the best ways to avoid slip and fall issues. To a great degree, texture determines a floor's slip resistance. Smooth floors made of glazed ceramic tile or terrazzo can be dangerously slippery under typical footwear when wet. Other floors with abrasives in their surface or specially textured metal plates can be quite slip resistant, even when wet or contaminated.

The best chance of reducing slip-and-fall accidents is during a facility's design phase when choosing floor materials. Some problem floors can be made safer by surface treatments, but others may need to be replaced or carpeted over, if possible. A good place to start is flooring materials certified by the National Floor Safety Institute ([www.nfsi.org](http://www.nfsi.org)).

- Know what the "out-of-the-box" slip resistance is on the floor materials in a facility. These numbers provide a baseline when considering changes to cleaning and floor maintenance practices. Have flooring COF audited after installation to confirm slip resistance.
- Select floor cleaning and maintenance products with proven slip resistance characteristics that are compatible with the particular flooring surfaces in a facility. A good place to start is with materials certified by the National Floor Safety Institute ([www.nfsi.org](http://www.nfsi.org)).
- Be alert for workers substituting cleaning materials or supplies. Ensure that sufficient cleaning supplies are available.
- Apply floor cleaning and maintenance products in accordance with the manufacturer's recommendations.
- Verify with cleaning personnel that they are familiar with and are using the correct cleaning and maintenance product application procedures. If there is a change in personnel or contractor, monitor usage again.
- Remove any unauthorized or incompatible cleaning and maintenance products, and educate staff on the potentially dangerous consequences that using the wrong products can have on the slip resistance of flooring surfaces.
- Separate cleaning and maintenance materials and equipment between the heavily soiled areas, such as food service areas, restrooms and break rooms, from other areas to reduce the likelihood of transporting a problem from one area to another. Color coding materials and equipment can provide instant recognition for personnel using them and can prevent usage of the wrong materials or equipment in an area of the facility.

For more information visit us online at [www.cna.com/riskcontrol](http://www.cna.com/riskcontrol).



- Ensure that permanently installed features like carpet runners and mats are included in the maintenance and housekeeping program. These materials need to be regularly inspected for the buildup of contaminants and for deterioration that could lead to the creation of slip or trip and fall hazards. Keep in mind that while mats reduce the likelihood of producing slips, improperly maintained mats can create trip hazards.
- Limit the difference in height between flooring surfaces and mats to no more than ¼” to ½”, while frequently inspecting mats to ensure they have not buckled or curled. Make sure that mats are firmly secured to the floor to prevent migration and that the floor beneath the mat is clean and dry. Make sure to evaluate the condition of these changes in height since they can deteriorate and create trip hazards.
- Make sure each area has good lighting. Good visibility is essential for the prevention of accidental slips, trips and falls. Evaluate facility and grounds during different times of the day and seasons of the year to determine whether lighting is adequate. Consider the earliest and latest times when visitors, pedestrians or employees are on the premises. Provide additional lighting for walking surfaces, as needed. Don't forget to include parking areas, stairways and loading docks. Promptly replace any burnt out bulbs.
- Regularly review all slip and fall incident reports associated with the facility and understand the critical factors associated with them. Look for trends in location, time of day, etc., and focus staff training on cleaning procedures for these factors. Train workers how to properly respond to slip and fall incidents. All incidents should be promptly investigated. Consult with legal counsel on the best way to document investigation results.
- Ensure that staff is well trained in spill prevention and response programs. They need to know where cleanup materials are located and how to use them in the event of an emergency. Instruct staff on the importance of reporting incidents and conditions that could result in incidents, even if none have actually occurred. Such reports will be the first indication of a potential issue that should be addressed.
- One of the surest ways to prevent the transmission of dirt, water and other materials from the outdoors to the interior of a facility is to implement a good mat program. Ensure that mats are frequently inspected and are checked regularly for wear and the buildup of contaminants.

In warm weather, place an abrasive mat outside and an absorptive mat inside. In cold weather, put an absorptive mat just inside the door, followed by an abrasive mat. When mats get dirty or saturated, they must be exchanged for clean ones. Offer plastic bags at the entrance for umbrella storage when it's raining so visitors don't shake out water from their umbrellas far into the building. A poorly managed and maintained mat program can significantly increase the likelihood of reducing the slip resistance of flooring surfaces.

- A walkway auditing program can help identify trends within a facility that can result in reduced slip resistance of flooring surfaces. To be effective, the testing should be completed in a consistent manner and include more than a single set of measurements
- Maintaining open and clear communication between staff, cleaning personnel and the walkway floor auditor is crucial to the identification of trends and elimination of factors that could reduce the slip resistance of floor surfaces.
- Make sure stairs comply with the local building code, and that nosings are easy to see — even for a visually impaired person. Stairs need to have very uniform rise and run, and handrails that are firmly mounted and easy to grip. Avoid having confusing carpet patterns on stairs or steps whose appearance make it hard to tell where each step's nose ends. On hard surfaces, abrasive tapes can help. Outdoor stairs must be slip-resistant when wet and should have stripes on each tread.
- Institute a program to regularly inspect all walkways, parking areas, stairs and indoor walking surfaces for condition and maintenance. Repair any unstable surfaces, such as loose tiles or torn carpet. Secure any mats, rugs or carpets that don't lie flat. Provide adequate clearances for doors, walkways and aisles. Keep floors clean and dry, and remove any obstructions or tripping hazards. Conduct

routine monitoring of any walking surface that is periodically wet or icy, such as sidewalks, building entrances or food coolers.

- Maintain surveillance of potentially slippery areas, and clean up spills before anyone falls. Instruct maintenance personnel to use “wet floor” signs to mark contaminated areas until the contaminant can be cleaned up.

CNA Risk Control works with business owners in all industries on slip and fall programs. To learn more about how CNA Risk Control can work with you to help you mitigate risks, please speak with your local independent agent, call us toll-free at 866-262-0540, or view our Risk Control tools online at [www.cna.com/riskcontrol](http://www.cna.com/riskcontrol).

For more information visit us online at [www.cna.com/riskcontrol](http://www.cna.com/riskcontrol).



**References**

- <sup>1</sup> Garner, Bryan A. *Black's Law Dictionary*. St. Paul, MN: Thomson/West, 8th ed. 2004.
- <sup>2</sup> Di Pilla, S. (2003). *Slip and fall prevention, a practical handbook*. CRC Press.
- <sup>3</sup> Goch, L. (2002, July). Loss/risk management notes. *Best's Review*, 71.
- <sup>4</sup> *Ibid.* 72.
- <sup>5</sup> *Injury facts 2005-2006 edition*. The National Safety Council.
- <sup>6</sup> Kendzior, Russell (1999), Slip-and-Fall Prevention Made Easy, Government Institutes.
- <sup>7</sup> *Fall accident prevention program*. National Floor Safety Institute. Produced as part of the NFSI Best Practices Project, 2003. Section 1.
- <sup>8</sup> *Ibid.* Section 4.
- <sup>9</sup> *The measurement of walkway slip resistance: walkway surface auditing as recommended by the national floor safety institute* (2006, October). National Floor Safety Institute.

The information, examples and suggestions presented in this material have been developed from sources believed to be reliable, but they should not be construed as legal or other professional advice. CNA accepts no responsibility for the accuracy or completeness of this material and recommends the consultation with competent legal counsel and/or other professional advisors before applying this material in any particular factual situations. This material is for illustrative purposes and is not intended to constitute a contract. Please remember that only the relevant insurance policy can provide the actual terms, coverages, amounts, conditions and exclusions for an insured. All products and services may not be available in all states and may be subject to change without notice. Use of the term "partnership" and/or "partner" should not be construed to represent a legally binding partnership. CNA is a service mark registered with the United States Patent and Trademark Office. Copyright © 2008 CNA. All rights reserved.

For more information visit us online at [www.cna.com/riskcontrol](http://www.cna.com/riskcontrol).

